

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A solid oxide fuel cell for coproducing syngas and electricity by internal reforming of methane and carbon dioxide ~~fabricated with,~~
comprising

an ion conductive solid oxide electrolyte,

a catalyst electrode (anode) and an air electrode (cathode) contacting the
electrolyte, wherein said catalyst electrode (anode) ~~is coated with~~ comprises Ni-YSZ
type or perovskite type metal oxide, and

a gas mixture having the following gas volume ratio:

$\text{CH}_4:\text{CO}_2:\text{H}_2\text{O}:\text{O}_2:\text{H}_2:\text{CO} = 1:0.4-0.6:0.4-0.7:0.01-0.2:0-1:0-1.$

2. (Previously presented) The solid oxide fuel cell according to claim 1, wherein one side of said solid oxide electrolyte is contacts a LaSrMnO_3 type air electrode (cathode) and the other side of said solid oxide electrolyte contacts a catalyst electrode (anode) of Ni-YSZ type or perovskite type metal oxide.

3. (Original) The solid oxide fuel cell according to claim 1 or 2, wherein said Ni-YSZ type metal oxide has a composition of 40-55 wt % of Ni, 40-55 wt % of YSZ and 0-10 wt% of CeO_2 or MgO .

4. (Canceled)

5. (Currently Amended) An electrochemical conversion system, comprising
~~a gas feed part (200), a reaction part (100) equipped with an electrochemical fuel cell and connected to said gas feed part and an analysis part (300) to measure and control reaction results of said reaction part, wherein the improvement comprises:—
a mixed gas containing carbon dioxide and hydrocarbon is introduced to said reaction part (100) through said gas feed part (200).~~

~~said reaction part (100) is equipped with a solid oxide fuel cell (SOFC) with a solid oxide electrolyte attached to an air electrode (cathode) and a catalyst electrode (anode) of Ni-YSZ type or perovskite type metal oxide, and
a syngas and an electricity are simultaneously co-produced in said catalyst electrode (anode) by internal reforming of methane and carbon dioxide and electrochemical reaction.~~

a gas feed,

a reactor comprising a solid oxide fuel cell having an air electrode (cathode) and a catalyst electrode (anode) of Ni-YSZ type or perovskite type metal oxide in flow communication with said gas feed,

a gas mixture having the following gas volume ratio:

$\text{CH}_4:\text{CO}_2:\text{H}_2\text{O}:\text{O}_2:\text{H}_2:\text{CO} = 1:0.4-0.6:0.4-0.7:0.01-0.2:0-1:0-1,$

where the gas mixture is introduced to said reactor through said gas feed.

6. (Cancelled)

7. (Currently Amended) The electrochemical conversion system according to claim 5, wherein the feed of CO₂ and CH₄ to said system is at least partially from a process producing CO₂ and CH₄ as by-products ~~any of claim 5-6, wherein said system is applied to a process producing greenhouse gases, CO₂ and CH₄ as by-product, a process using hydrogen, natural gases and petroleum as heat source, a petrochemical process, a cement process, a process treating gases generated in landfill gas and thermoelectric power plants.~~

8. (Canceled)

9. (Withdrawn) A process for preparing an electrochemical cell for internal reforming of hydrocarbon and carbon dioxide, which comprises the steps of:

(a) preparing an aqueous precursor solution having a composition of 40-55 wt % of Ni 40-55 wt % of YSZ and 0-10 wt % of CeO₂ or MgO;

(b) adding and mixing 0.3-1.2 wt % of methyl cellulose 0.8-1.5 wt % of carbonylmethyl cellulose and 1.3-2 wt % of polyethylene oxide as a binder, and 1-5 wt % of isopropylalcohol (IPA) as a dispersant based on 100 wt % of solid content to said aqueous precursor solution, and then ball-milling to obtain a Ni-YSZ type anode slurry, and

(c) coating one side of a planar-type solid oxide electrolyte with said catalyst electrode slurry prepared above and the other side with an air electrode material (LSM), drying and sintering to prepare a disk shape.